

Physics Masters: One Year After Degree

Data from the degree recipient follow-up survey for the classes of 2016, 2017, and 2018

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After receiving their degrees, exiting master's degree holders have a variety of employment and education options available to them. Many students enter or remain in the workforce, whereas others continue their graduate education in physics or other subjects. Some new exiting masters, mostly non-US citizens, leave the US after receiving their degrees.

Physics departments in the US averaged 942 exiting physics master's degrees a year in the classes of 2016, 2017, and 2018. These new exiting physics masters were asked about their current status in the winter following the academic year in which they received their degrees. This Focus On looks at the different post-degree pursuits of the exiting physics masters from these three classes combined, reporting on sectors and fields of employment, skills used, and starting salaries.

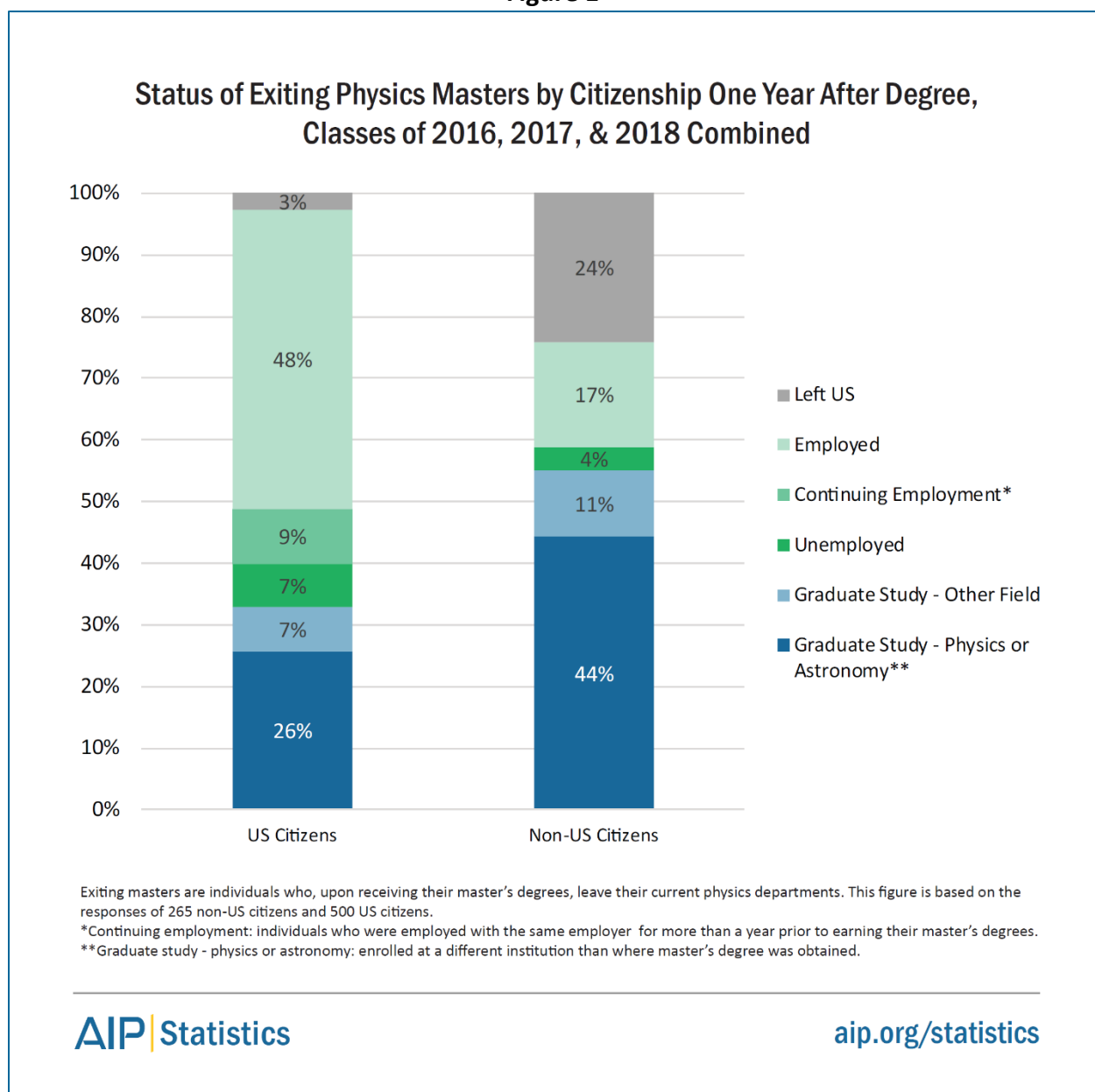
Initial Outcomes

In this report, exiting masters are people who received their degrees from a US physics department and left that department with no degree higher than a master's degree. Exiting master's degrees can be earned at departments where the master's is the highest degree offered as well as at departments that offer a PhD. Each year there are many students who earn a master's en route and continue working toward a physics PhD at the same institution. They are not included in this analysis.

The initial post-degree outcomes of new physics masters are greatly influenced by the citizenship of the degree recipient (**Figure 1**). The majority of masters with US citizenship either entered the workforce or remained in positions they held prior to receiving their degrees. The most common post-degree outcome for masters with non-US citizenship was the continuation of their graduate studies. Almost a quarter of non-US citizens left the country upon receiving their master's degrees in physics, compared to only 3% of US citizens. These differences in initial outcomes by citizenship have been the norm for exiting physics masters for many years.

Many of the employed new physics masters did not intend to end their education at the master's level, with about 12% indicating that they intended to return to graduate school in the future. For masters choosing to immediately continue their graduate studies, the majority were enrolled in a physics or astronomy program at another US institution. The most commonly cited "Other Field" of graduate study pursued was engineering.

Figure 1



Demographics

The average age for physics masters from the classes of 2016, 2017, and 2018 was 28.4 years old, with a median of 26.6. Those who were continuing in positions they held prior to receiving their degrees were, on average, about four years older than those who entered new positions. The classes of 2016, 2017, and 2018 combined were comprised of 24% women and 34% non-US citizens (**Table 1**). Fifteen percent of respondents indicated that they started their secondary education at two-year colleges.

Table 1

**Demographic Profile of Exiting Physics Masters,
Classes of 2016, 2017, & 2018 Combined**

Gender*	Men	76%
	Women	24%
Citizenship*	US	66%
	Non-US	34%
Age	Median	26.6
	Mean	28.4

Exiting masters are individuals who, upon receiving their master's degrees, leave their current physics departments.

*Data from the AIP Enrollments and Degrees Survey.

According to data from the AIP Degree Recipient Follow-Up Survey, less than 1% of physics masters identified themselves as a gender category other than man or woman.

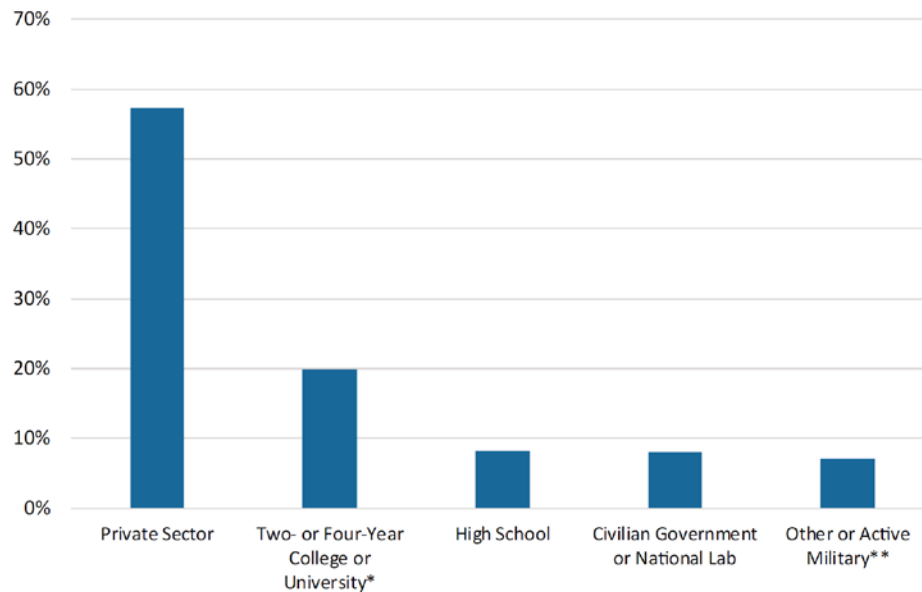
Employment Sectors

The private sector employs the largest proportion of physics masters, with more than half of those employed indicating that this sector is where their jobs were located. The next largest employment sector was two- and four-year colleges and universities (**Figure 2**). Almost all of those employed at high schools were teachers in STEM subjects. About one in six employed masters (16%) were continuing positions that they had held for more than a year prior to receiving their degrees.

About 15% of the employed physics masters indicated their positions were part time (less than 35 hours a week). Exiting masters employed at colleges and universities had the highest proportion working part time (41%). About 8% of those employed in the private sector indicated they were employed part time.

Figure 2

Employment Distribution of Exiting Physics Masters One Year After Degree, Classes of 2016, 2017, & 2018 Combined



Exiting masters are individuals who, upon receiving their master's degrees, leave their current physics departments.

Figure includes US employed physics masters, including those who were employed part-time and not enrolled in a degree program and masters continuing in positions they held while pursuing their degrees. Other includes elementary and middle schools, health care facilities, and non-profit organizations. Figure based on responses from 349 individuals.

*Includes university-affiliated research institutes (UARI).

**Active military excludes those receiving their master's degrees from military academies.

Employment Sector Profiles for Exiting Physics Masters, Combined Classes of 2016, 2017, & 2018

Private Sector

The private sector employed the largest proportion of new exiting physics masters, with almost 60% of those employed. Positions in the private sector covered a range of different jobs, from large corporations to self-started companies. The vast majority of these jobs were in a STEM field, with engineering being the most common. Job titles often included words such as “engineer” or references to various analyst positions.

College/University/UARI

Twenty percent of the employed exiting physics masters were employed at two- or four-year colleges, universities, or at university-affiliated research institutes (UARI). Two-fifths of masters employed at colleges or universities indicated they were employed part time and were most commonly at two-year colleges. Masters employed at academic institutions were often among the faculty.

High School

Just under a tenth of employed physics masters were employed at high schools. In many states a master’s degree is mandatory for high school teachers to maintain their certification. The most commonly taught subject among this group was physics, although there were also a number of respondents who indicated that they were teaching mathematics. Very few taught non-STEM subjects.

Civilian Government

About one exiting physics master in ten worked in a civilian government position. Employers included national labs as well as civilian government organizations. The majority of exiting physics masters employed in civilian government worked in either physics or in engineering.

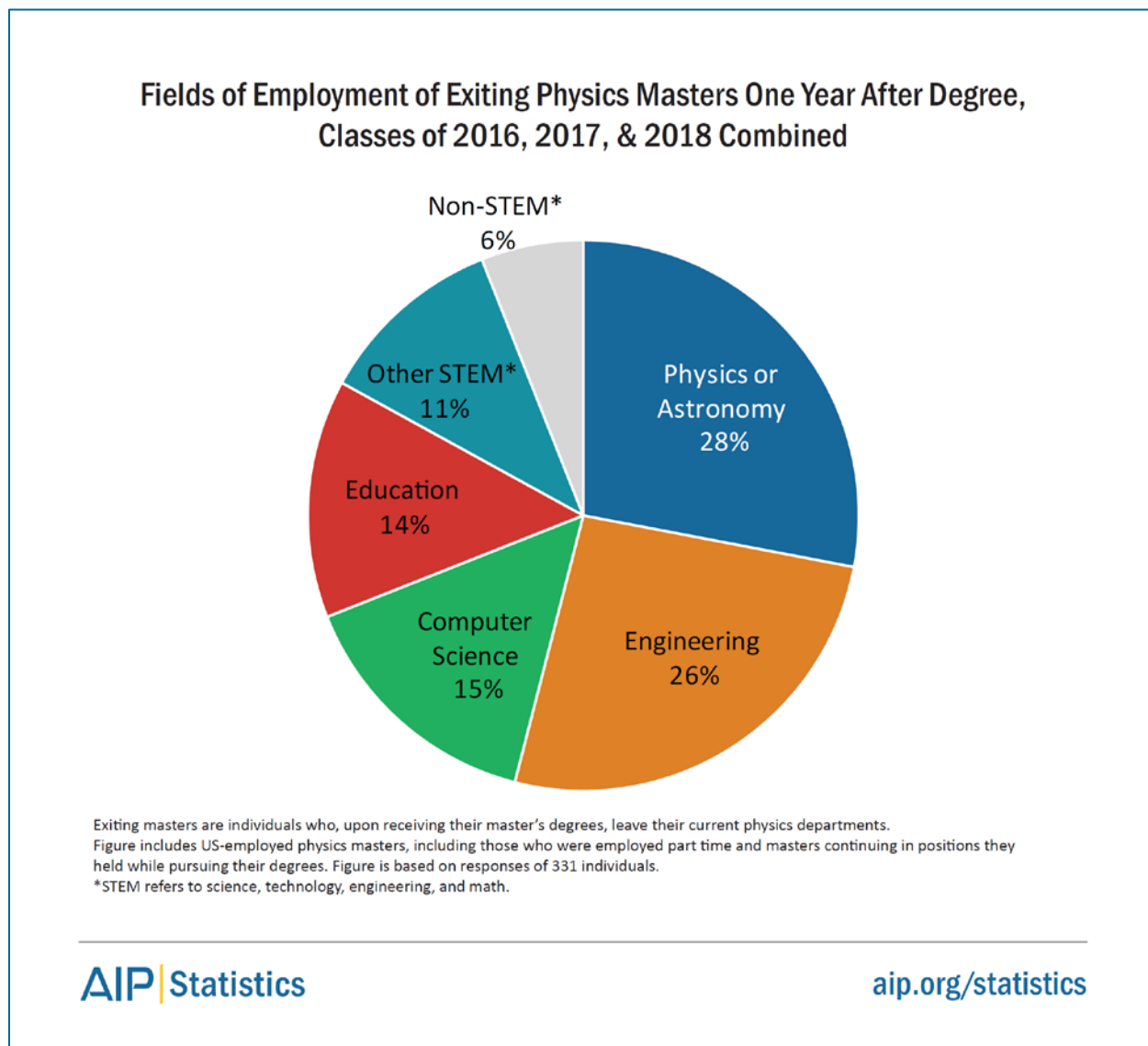
Active Military

Exiting physics masters in the active military come from two sources. The primary source is master’s recipients that attended one of two military academies with graduate physics programs: the Naval Postgraduate School (California) and the Air Force Institute of Technology (Ohio). The other source is active military personnel who attended a nonmilitary university to obtain a physics master’s degree. Physics masters who are military personnel have specialized degrees and enter or continue in a variety of highly technical positions within the armed services.

Fields of Employment

Four-fifths of exiting physics masters were employed in a STEM field, with the most commonly reported field being physics or astronomy, followed closely by engineering. About 15% of physics masters indicated that they were working in computer science. Education accounted for about 14% of employed physics masters. Six percent of respondents were working in a non-STEM field, with the most common non-STEM field being finance (**Figure 3**).

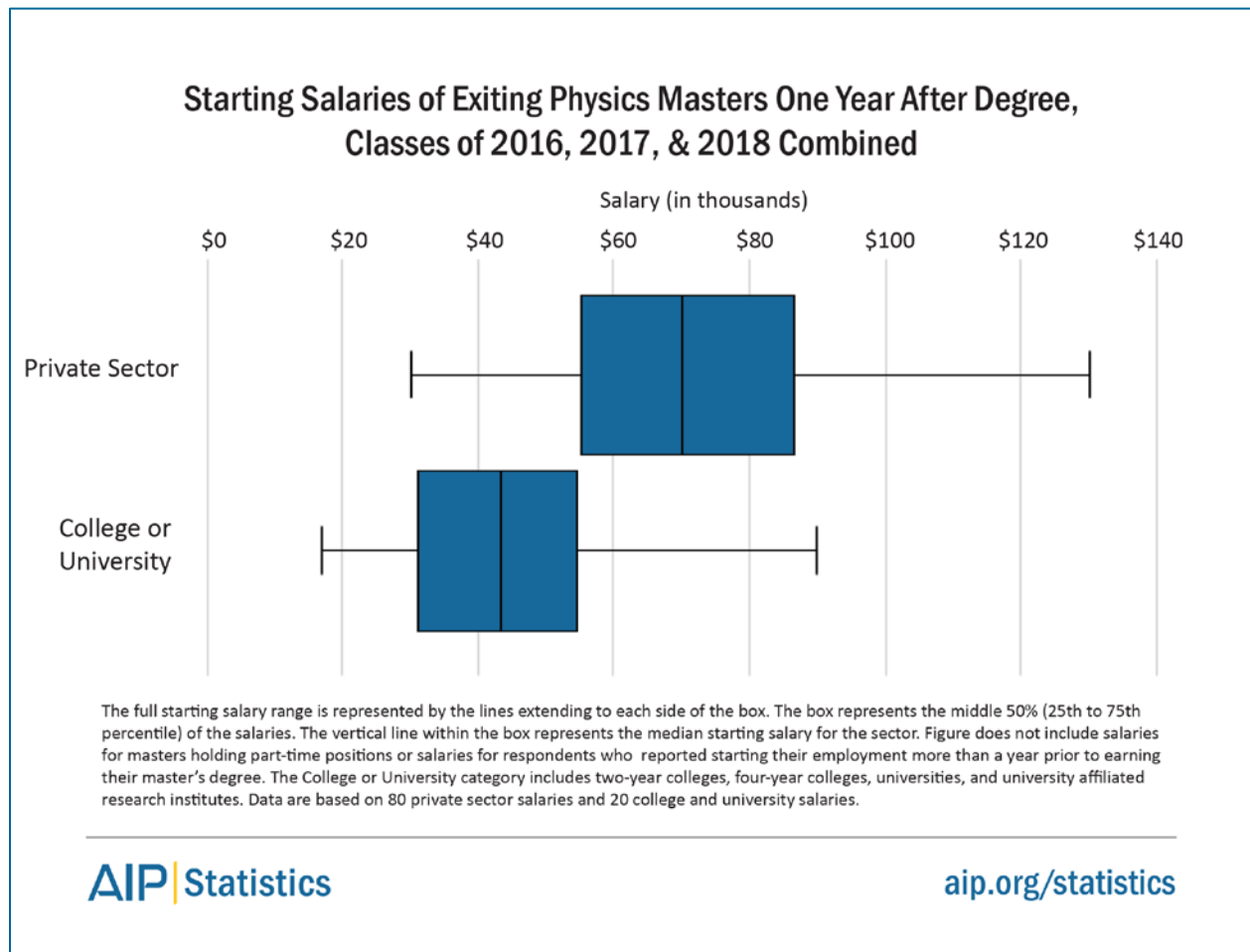
Figure 3



Salaries

Masters in private sector jobs had higher starting salary ranges than those in university or two- or four-year college positions. The median starting salary for private sector positions was \$70,000, while the median for a two- or four-year college or university position was \$43,500 (**Figure 4**). Most of the private sector jobs likely represent twelve-month employment, while academic positions are often paid on nine- or ten-month contracts. Both the private sector and college and university positions have wide starting salary ranges, with some masters receiving salaries considerably higher than the median.

Figure 4



Knowledge and Skills

Physics masters employed in academia were more likely to report that they were using their physics and advanced math knowledge than those employed in the private sector. Those in the private sector were more likely to report greater use of a variety of skills than those in academia, including working on teams, working with clients, and performing advanced research. Generally, those in the private sector used technical skills more regularly than those in academia. They also often reported higher rates of using “soft” skills, which often involve interaction with other individuals. Regardless of sector of employment, physics masters reported that they regularly solved technical problems and needed to use their programming skills (Figures 5 & 6).

Figure 5

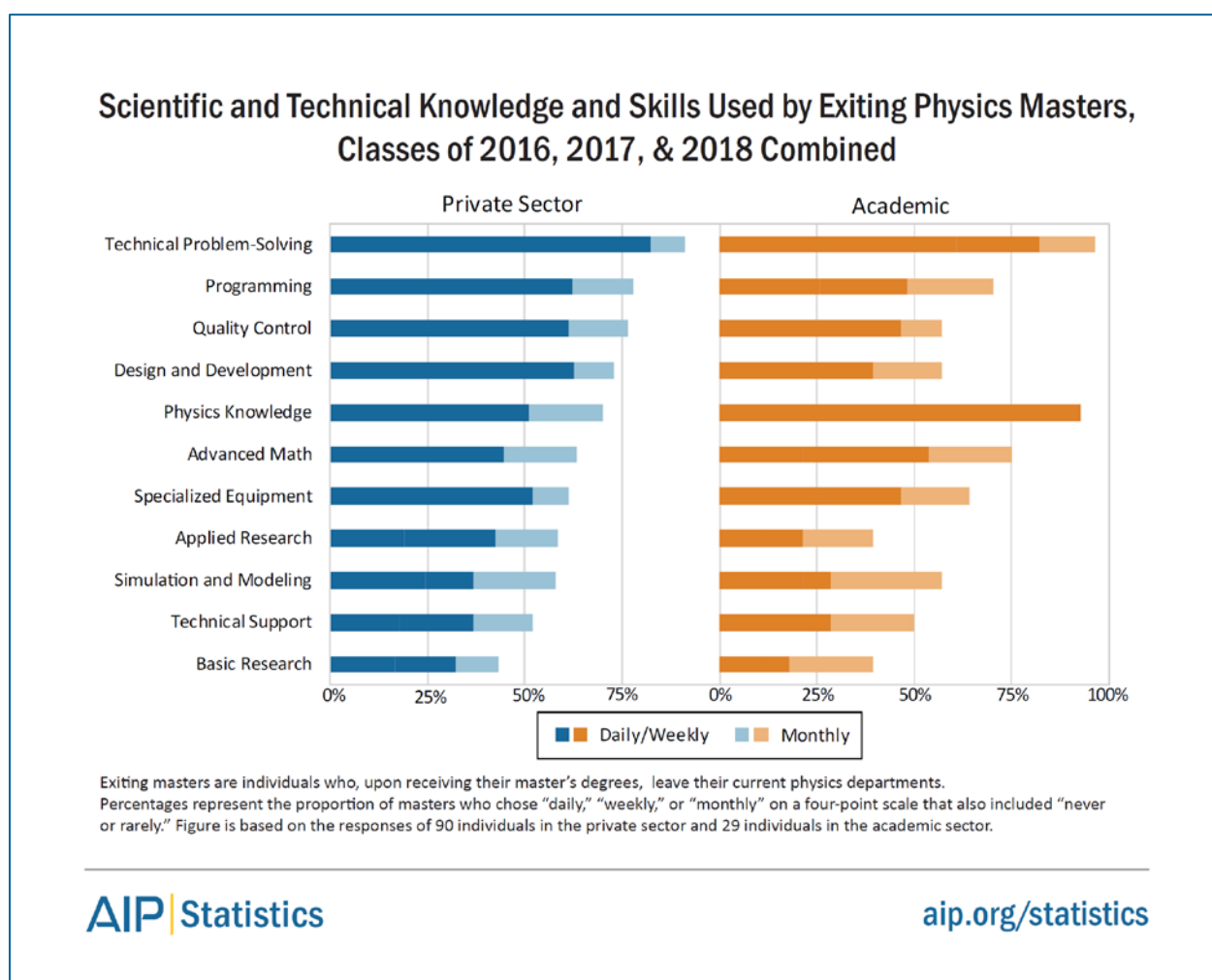
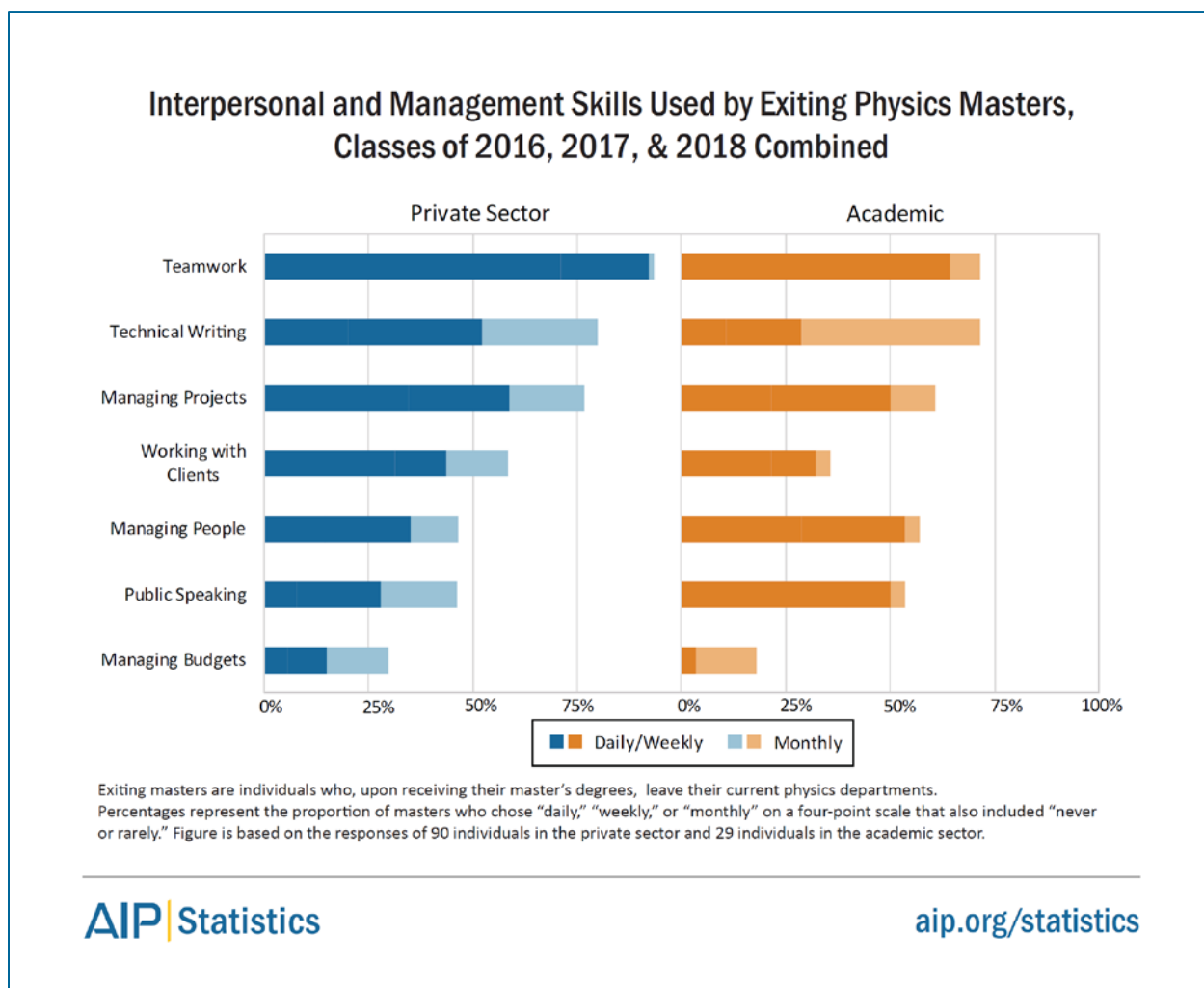


Figure 6

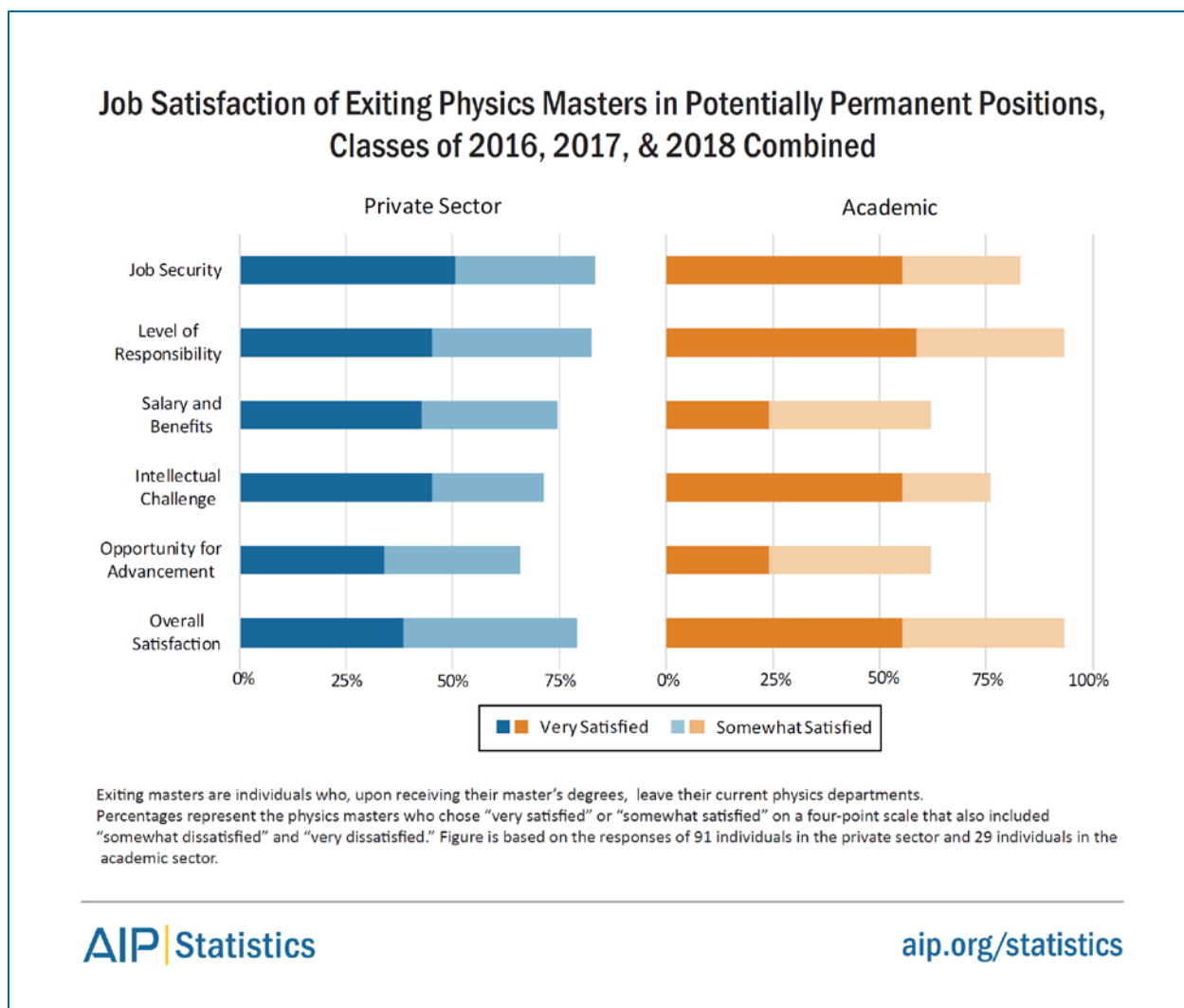


Job Satisfaction

New physics masters employed in the private sector indicated high rates of satisfaction with their positions, with the highest levels reported concerning job security and level of responsibility. Over three-quarters of respondents indicated they were somewhat or very satisfied with their private sector position. The job satisfaction measure with the lowest level of satisfaction reported for masters employed in the private sector concerned their opportunities for advancement, with a third of respondents reporting some level of dissatisfaction (**Figure 7**).

Academically employed physics masters reported a higher overall rate of satisfaction than those working in the private sector positions, 93% vs. 79%. They also reported higher satisfaction with their levels of responsibility. Those employed in academia reported lower rates of satisfaction with their salaries and benefits, consistent with their comparatively lower salaries shown earlier, as well as with their opportunities for advancement, than masters employed in the private sector (**Figure 7**).

Figure 7



Masters were asked what they found the most rewarding in the positions they held. Individuals employed in the private sector often cited the ability to expand their knowledge and the challenging work as rewarding aspects of their employment. There were also numerous mentions of appreciating that their work was hands-on and that they were solving meaningful real-world problems. The most commonly reported positive aspects of academic employment included being able to teach subjects that they were passionate about and finding the work fulfilling.

Evaluation of Education and Future Plans

When asked, "What would you do differently concerning your physics education?" the most common responses from physics masters indicated that they were generally happy with their degrees and would change very little. There were some noteworthy exceptions. There were

several mentions of wishing they had focused more on computer science or programming classes. Additionally, there were a variety of respondents who would have liked to get more involved in research through jobs or internships during their time in graduate school. A number of respondents also indicated that they should have immediately entered into a PhD program rather than a master's program.

Looking toward the future, a third of exiting physics masters indicated that in ten years' time they hoped to work in the private sector. A similar proportion hoped to be employed at a four-year college or university. More than half of those who were employed in an academic setting hoped to continue to work within that sector, while those employed in the private sector more often indicated that they hoped to continue their careers in a different sector.

Survey Methodology

Each fall, the Statistical Research Center conducts the Survey of Enrollments and Degrees. This survey asks physics and astronomy departments to provide information on the number of students enrolled and the number of recent degrees conferred the previous academic year. This survey also asks for the names and contact information of recent degree recipients. This degree recipient information is used to conduct our master's follow-up survey in the winter following the academic year in which they received their degrees.

Recent master's degree recipients can be very difficult to reach because they tend to move after receiving their degrees and frequently do not keep in contact with their master's-granting departments. For assistance in determining degree recipient outcomes and to help obtain updated contact information, we contact the advisors of nonresponding degree recipients.

Because of the relatively small number of individuals receiving physics master's each year and the difficulty in obtaining accurate contact information, we are reporting on three years of survey responses combined. The exiting physics master's classes of 2016, 2017, and 2018 consisted of 940, 930, and 956 degree recipients, respectively. We received post-degree information on 33% of these degree recipients, with about half of the information coming directly from the degree recipients.

There are two military academies that have unique graduate physics programs: the Naval Postgraduate School (California) and the Air Force Institute of Technology (Ohio). These two departments have very specialized master's programs and were responsible for conferring about 4% of all exiting physics master's degrees in the classes of 2016, 2017, and 2018. The degree recipients from those programs typically stay in one of the branches of the armed services and by the nature of their positions are hard to reach with our follow-up survey. The post-degree outcome data for these individuals are not included in the tables and figures of this report.

We thank the many physics degree recipients and faculty advisors who made this publication possible.

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